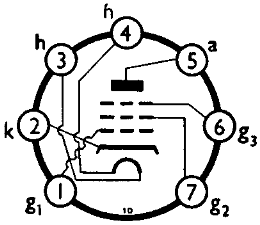
MINIATURE R.F. PENTODE 6·3V INDIRECTLY HEATED

Z77

APRIL, 1952

BASE CONNECTIONS AND VALVE DIMENSIONS



View from underside of base.

Base : B7G
Bulb : Tubular

Overall length :	49—55	mm.
Seated length :	43—49	mm.
Max. diameter :	19	mm.

RATING

Pentode Connection

V_h	6·3	V
I_h	0·3	A
$v_{h\text{-}k}$ (pk)	150 max.	V
V_a	250	V
V_{g2}	250	V
p_a	2·5 max.	W
p_{g2}	0·8 max.	W
r_a } at $V_a = V_{g2} = 250$, $I_a = 10$ mA	0·3	MΩ
g_m } at $V_a = V_{g2} = 250$, $I_a = 10$ mA	7·5	mA/V

Triode Connection

I_k	30 max.	mA
$V_{a,\,g2}$	250 max.	V
$p_{a,\,g2}$	3·3 max.	W
μ } at $V_{a,\,g2} = 250$, $V_{g1} = -2$	75	
r_a } at $V_{a,\,g2} = 250$, $V_{g1} = -2$	10	kΩ
g_m } at $V_{a,\,g2} = 250$, $V_{g1} = -2$	7·5	mA/V

CAPACITANCES (of cold unscreened valve)

$c_{g1\text{-}all}$ 7·4 pF $c_{a\text{-}all}$ 3·1 pF $C_{a\text{-}g1}$ 0·009 pF

TYPICAL OPERATION

Class A Amplifier. Pentode Connection

V_a	250	V
V_{g2}	250	V
V_{g3}	0	V
I_a	10	mA
I_{g2}	2·5	mA
V_{g1}	−2 approx.	V
R_k	160	Ω

MARCONI'S WIRELESS TELEGRAPH COMPANY LIMITED

Head Office: Marconi House, Chelmsford . Telephone: Chelmsford 3221 . Telegraphic Address: Expanse, Chelmsford

Mixer. Pentode Connection

Series injection to g_1.

V_a	250	V
V_{g2}	250	V
V_{g3}	0	V
I_a	4·5	mA
I_{g2}	1·5	mA
R_k	680	Ω
g_c	2·7	mA/V
v_{osc} (pk)	4·5	V

Class A. Amplifier. Triode Connection

$V_{a,\,g2}$	250	V
V_{g1}	−2 approx.	V
$I_{a,\,g2}$	12·5	mA
R_k	160	Ω
μ	75	
g_m	7·5	mA/V
r_a	10	k

Class A Amplifier. Pentode Connection

$V_{a,\,g3}$	28	V
V_{g2}	8	V
I_a	0·75	mA
I_{g2}	0·15	mA
R_L	22	kΩ
R_k	2·2	kΩ
Gain	30	db

Whenever possible, a potentiometer supply should be used for V_{g2}.

GENERAL

At $V_a = V_{g2} = 250$, $V_{g3} = 0$, $I_a = 10$ mA.

$c_{g1\text{-}k}$	10	pF
$c_{a\text{-}k}$	3	pF
$c_{h\text{-}k}$	4	pF
$r_{g1\text{-}k}$ (at 45 Mc/s)	9	kΩ
r_{eq} noise ref g1	1·0	kΩ

Under conditions of maximum anode and screen dissipation, the D.C. resistance between control grid and cathode must not exceed 0·5 MΩ with auto-bias, or 0·1 MΩ with fixed bias.

SCREENING

No internal or external screening is fitted to the valve.

MOUNTING

Any position.

RETAINING

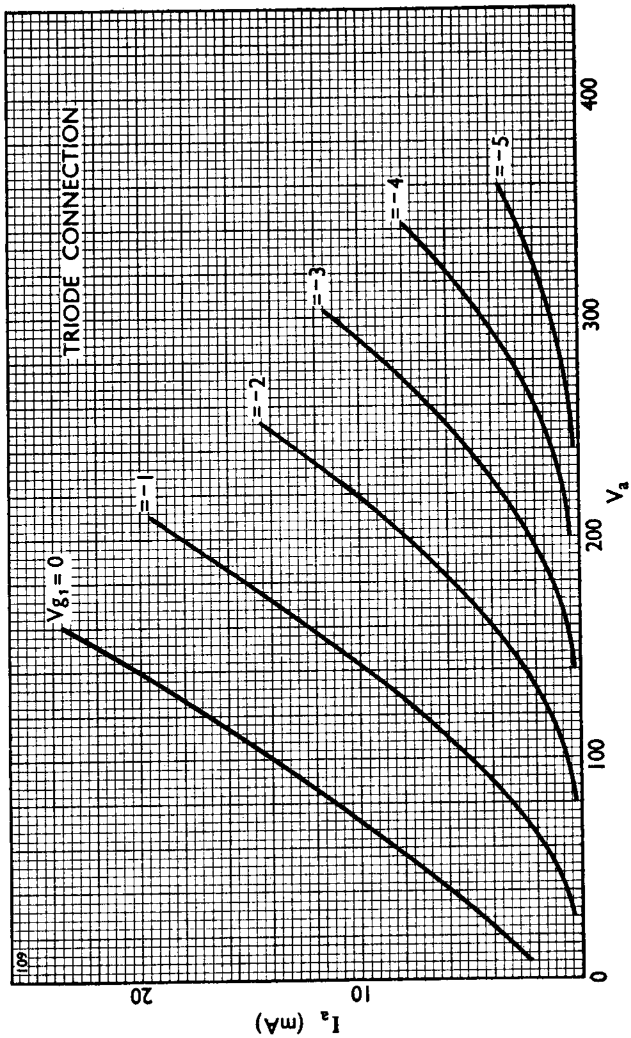
A retaining device should be used.

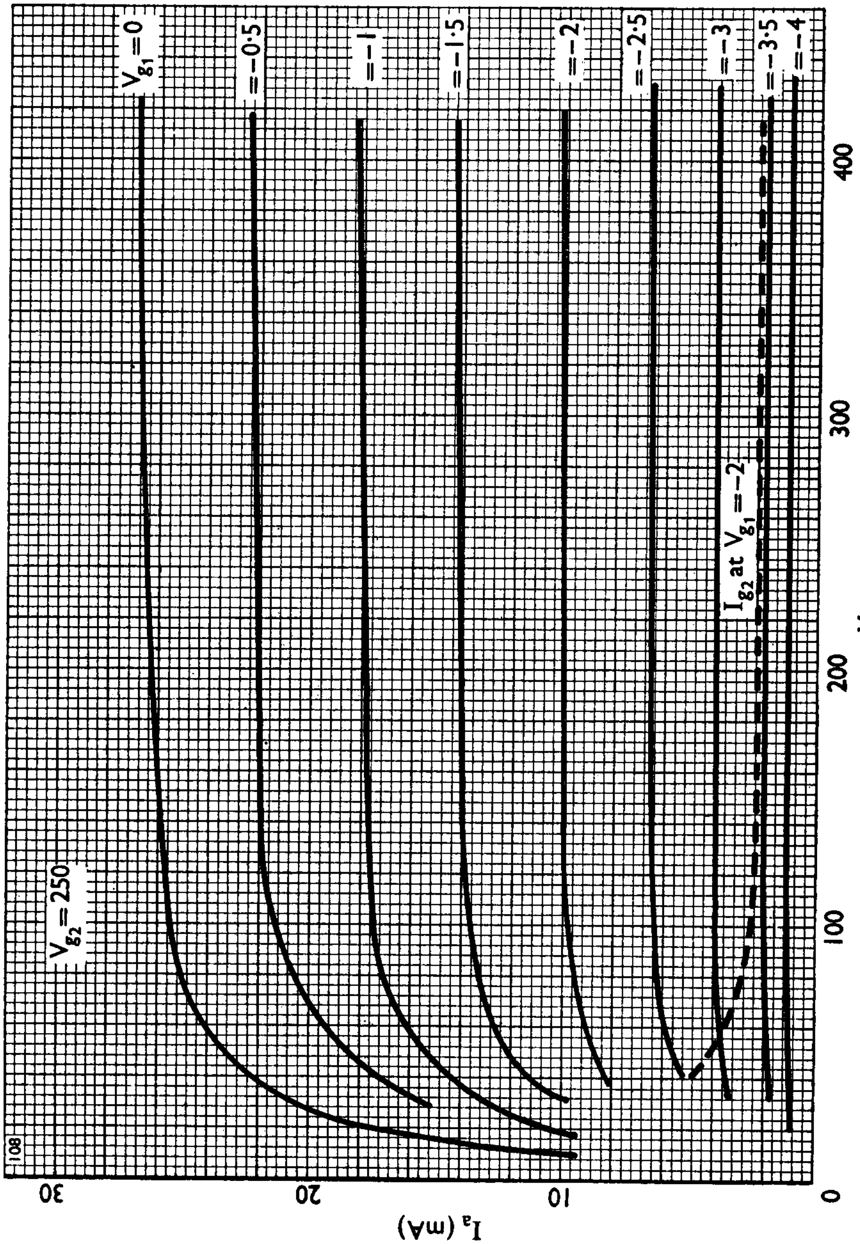
VENTILATION

The valve and screening canister should be mounted to provide as much free air circulation as possible.

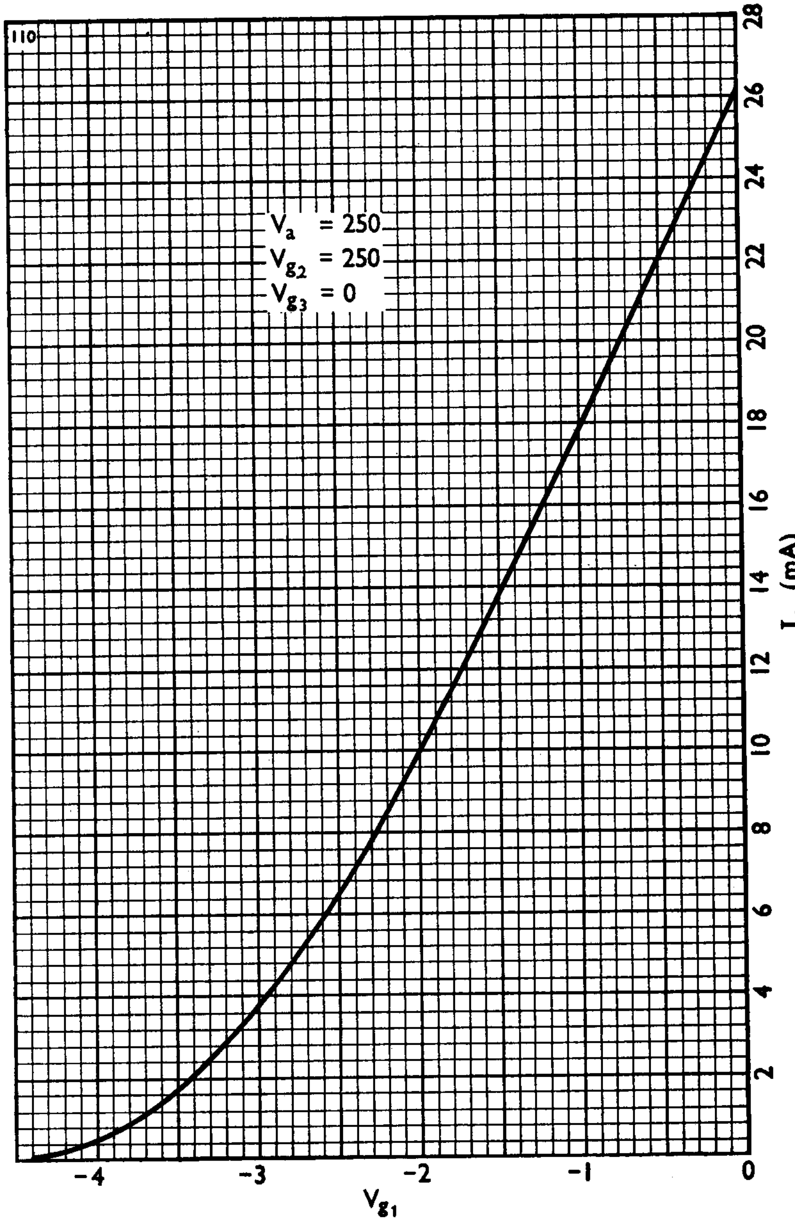
MICROPHONY

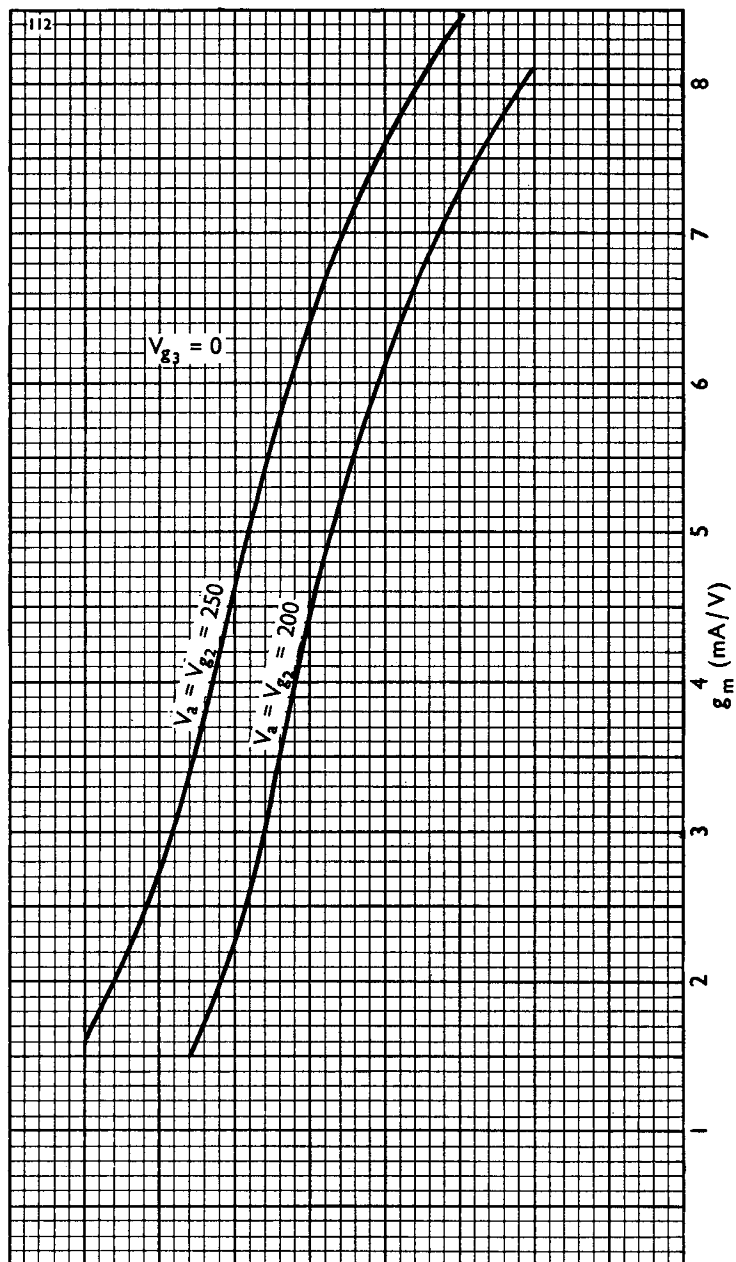
Although this is of a very low order, equipment should be designed to minimise microphony.

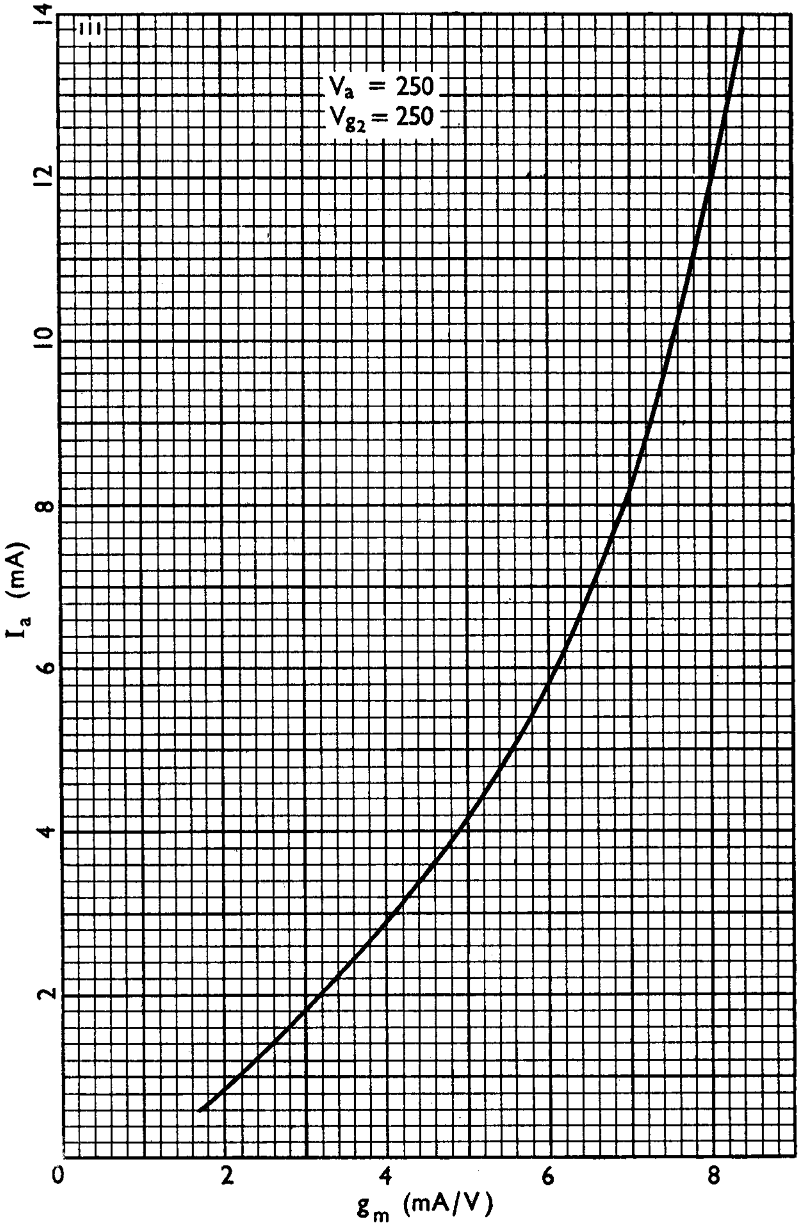




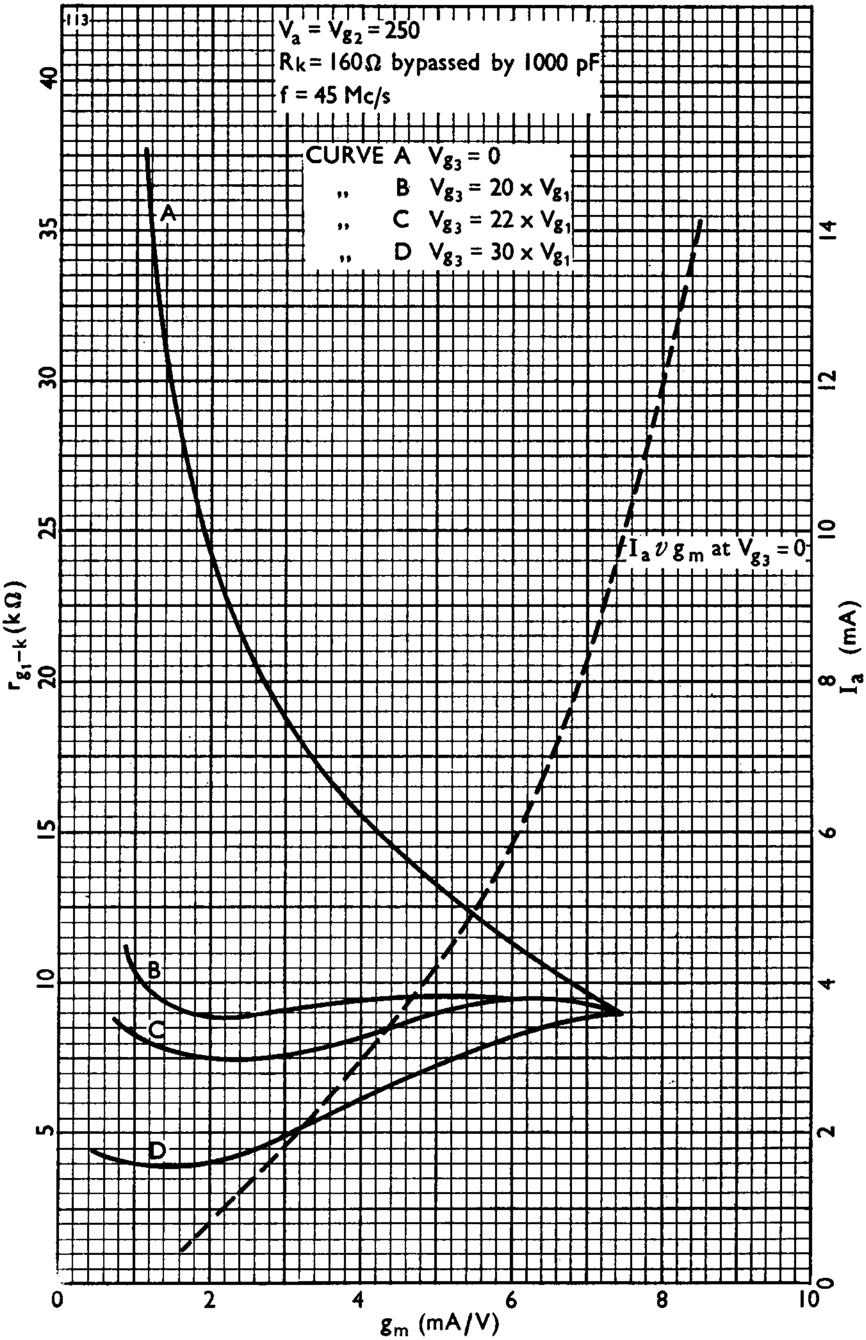
$V_{g2}=250$
$V_{g1}=0$
$=-0·5$
$=-1$
$=-1·5$
$=-2$
$=-2·5$
$=-3$
$=-3·5$
$=-4$
I_{g2} at $V_{g1}=-2$
V_a
I_a (mA)
0
100
200
300
400
10
20
30
108

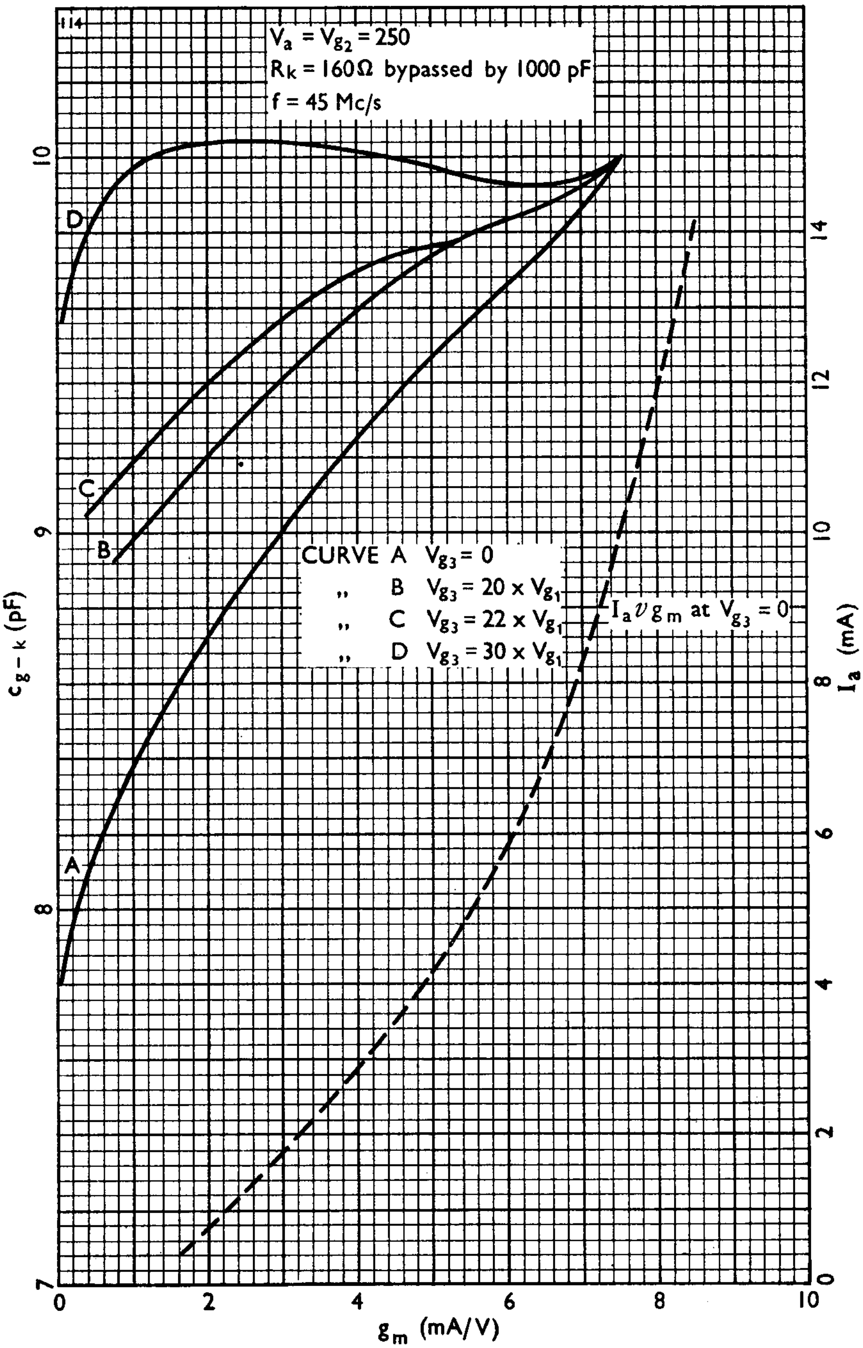

110
Va = 250
Vg2 = 250
Vg3 = 0
Ia (mA)
Vg1
-4
-3
-2
-1
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28

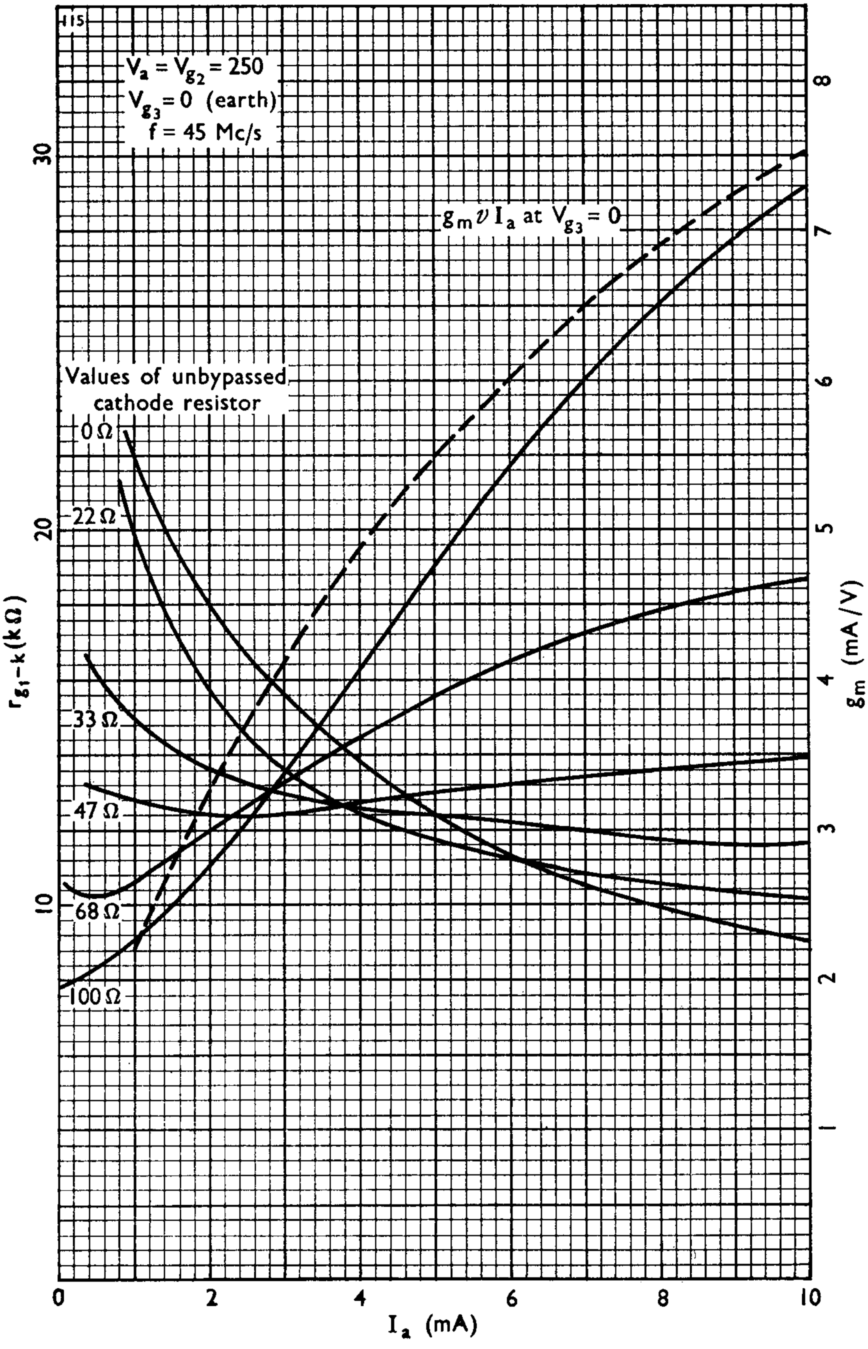

112
Vg3 = 0
Va = Vg2 = 250
Va = Vg2 = 200
gm (mA/V)
1
2
3
4
5
6
7
8
Vg1
-4
-3
-2
-1
0



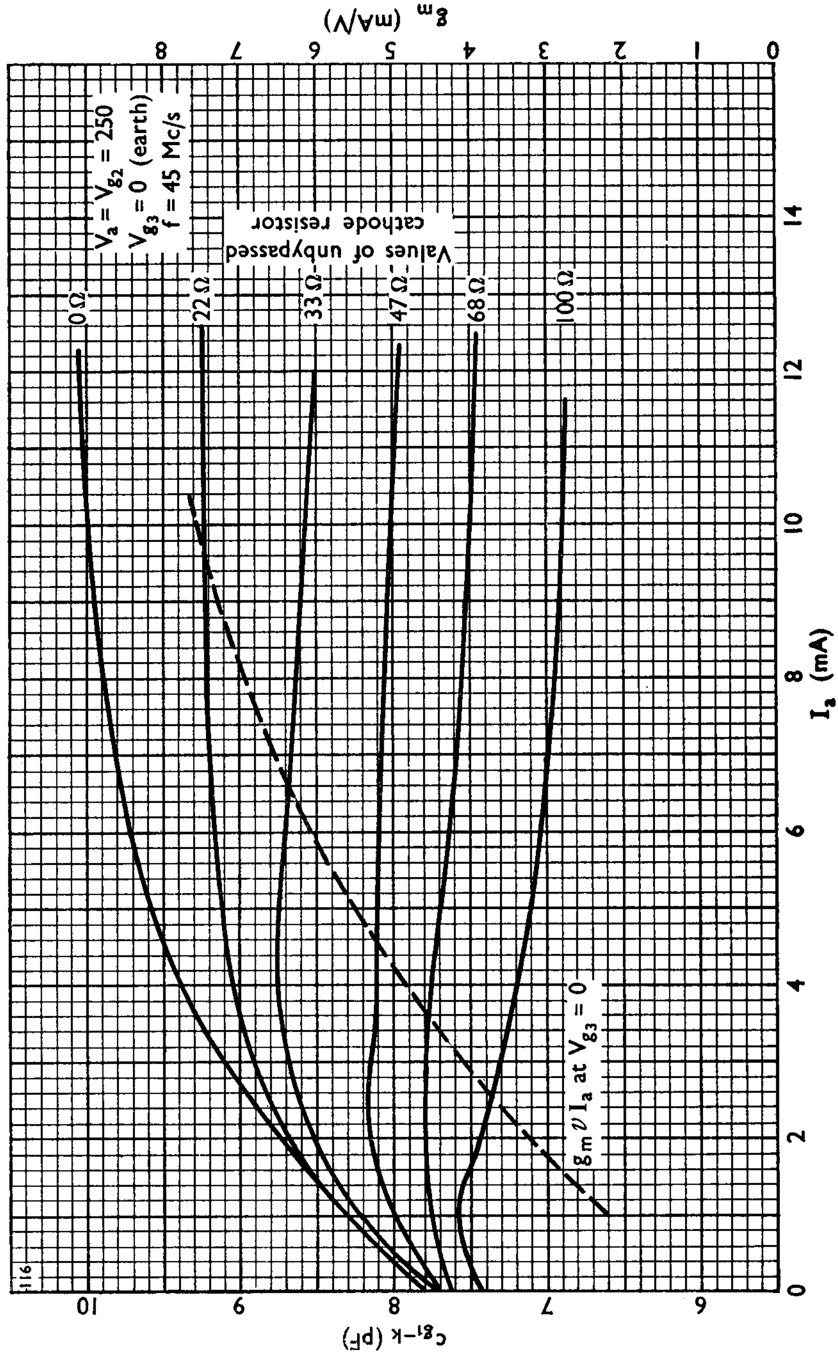
V_a = 250
V_{g2} = 250
I_a (mA)
g_m (mA/V)
0
2
4
6
8
10
12
14


113
$V_a = V_{g_2} = 250$
$R_k = 160\Omega$ bypassed by 1000 pF
f = 45 Mc/s
CURVE A $V_{g_3} = 0$
,, B $V_{g_3} = 20 \times V_{g_1}$
,, C $V_{g_3} = 22 \times V_{g_1}$
,, D $V_{g_3} = 30 \times V_{g_1}$
A
B
C
D
$I_a\ v\ g_m$ at $V_{g_3} = 0$
r_{g_1-k} (kΩ)
40
35
30
25
20
15
10
5
I_a (mA)
14
12
10
8
6
4
2
0
0
2
4
6
8
10
g_m (mA/V)


114
$V_a = V_{g_2} = 250$
$R_k = 160\Omega$ bypassed by 1000 pF
f = 45 Mc/s
CURVE A $V_{g_3} = 0$
" B $V_{g_3} = 20 \times V_{g_1}$
" C $V_{g_3} = 22 \times V_{g_1}$
" D $V_{g_3} = 30 \times V_{g_1}$
I_a v g_m at $V_{g_3} = 0$
A
B
C
D
c_{g-k} (pF)
7
8
9
10
I_a (mA)
0
2
4
6
8
10
12
14
g_m (mA/V)
0
2
4
6
8
10



115
$V_a = V_{g_2} = 250$
$V_{g_3} = 0$ (earth)
f = 45 Mc/s
$g_m \, v \, I_a$ at $V_{g_3} = 0$
Values of unbypassed cathode resistor
0 Ω
22 Ω
33 Ω
47 Ω
68 Ω
100 Ω
r_{g_1-k} (kΩ)
g_m (mA/V)
I_a (mA)
0
2
4
6
8
10
20
30
1
3
5
7


$V_a = V_{g2} = 250$
$V_{g3} = 0$ (earth)
f = 45 Mc/s
Values of unbypassed cathode resistor
0 Ω
22 Ω
33 Ω
47 Ω
68 Ω
100 Ω
g_m v I_a at $V_{g3} = 0$
g_m (mA/V)
0
1
2
3
4
5
6
7
8
I_a (mA)
0
2
4
6
8
10
12
14
c_{g1-k} (pF)
6
7
8
9
10
116

Z77

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